



# **Air Quality Issues in Maryland**

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# Constituents of Clean Air

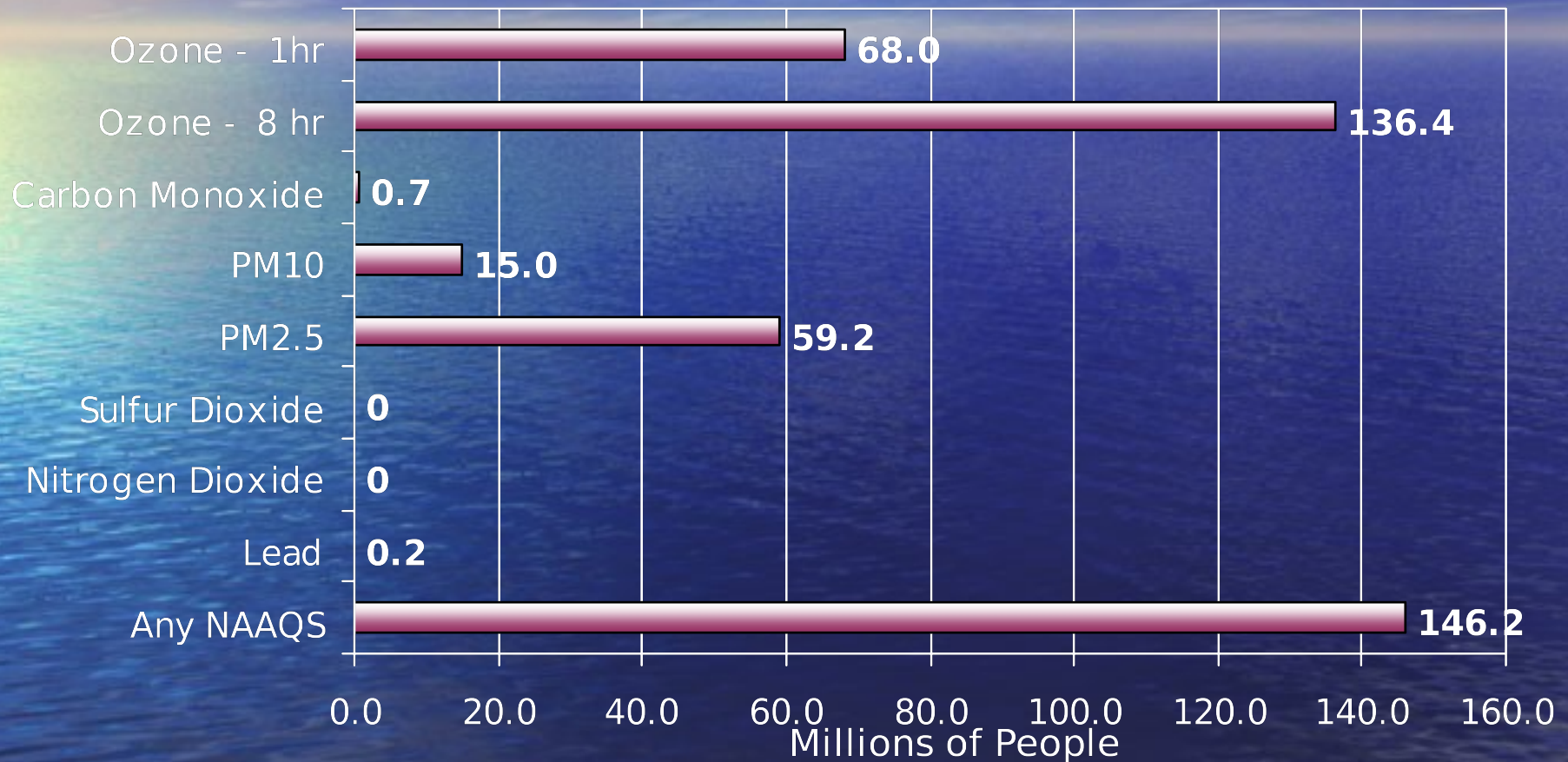
- Nitrogen (78.08%)
- Oxygen (20.95%)
- Argon (0.93%)
- Carbon Dioxide (0.03%)
- Trace amounts of Neon, Methane, Helium, Krypton, Hydrogen & Xenon



# **Pollutants Regulated by National Ambient Air Quality Standards (NAAQS)**

- Ozone ( $O_3$ )
- Carbon Monoxide (CO)
- Particulate Matter ( $PM_{10}$ ,  $PM_{2.5}$ )
- Sulfur Dioxide ( $SO_2$ )
- Nitrogen Dioxide ( $NO_2$ )
- Lead (Pb)

# # of People Living in Areas that Exceed National Air Standards - US

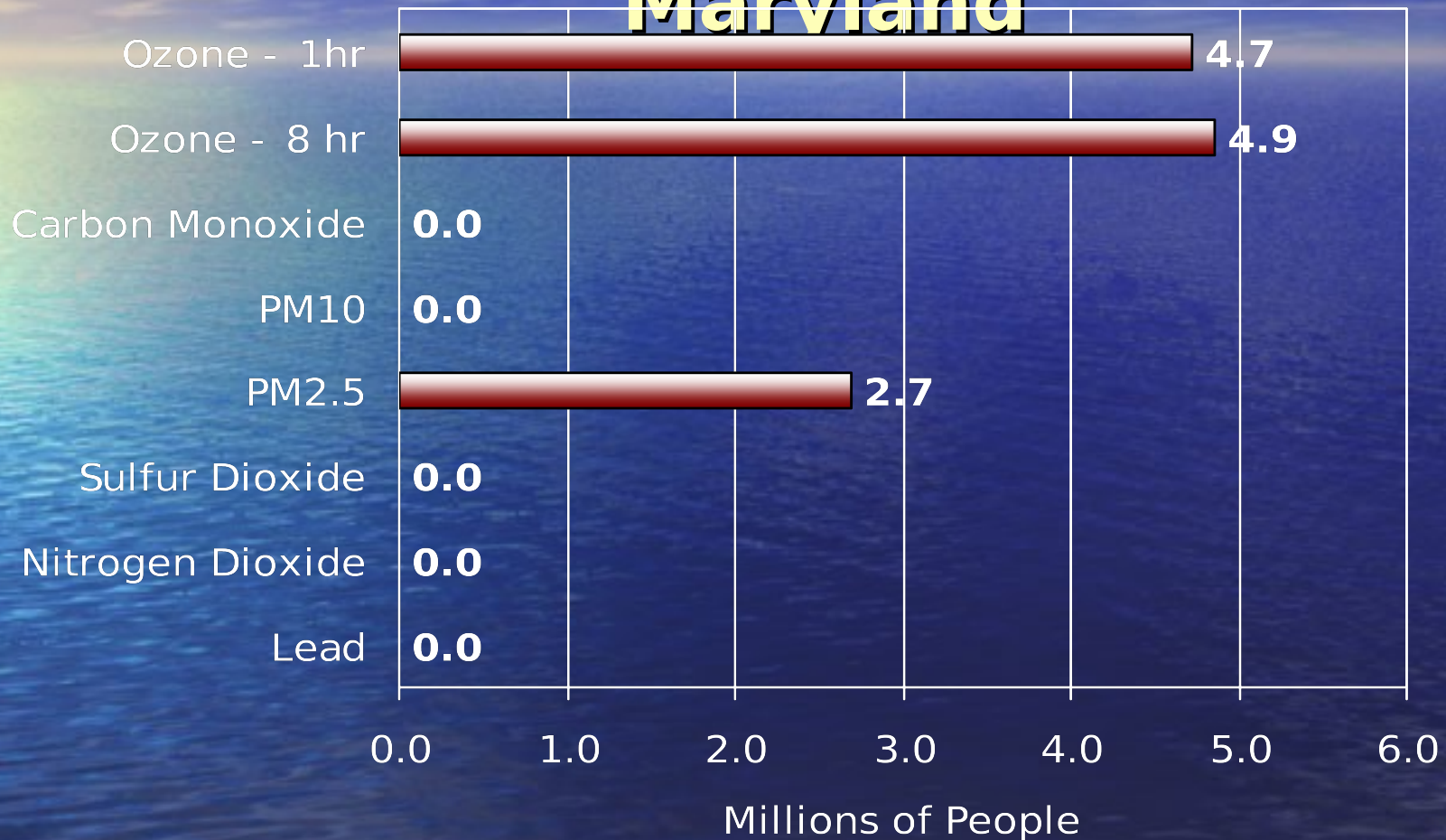


May 2004

**US Population = 290  
million**



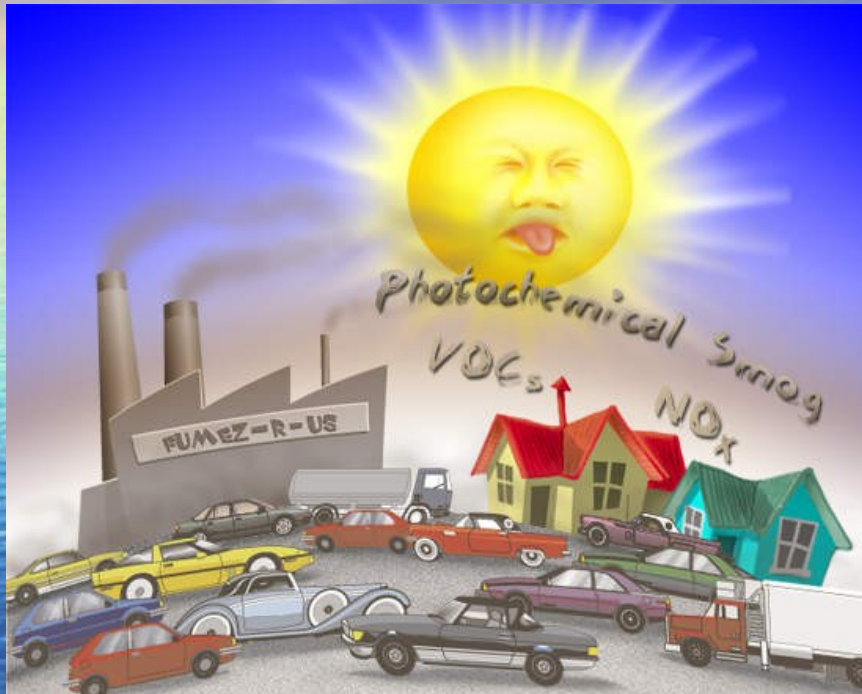
# # of People Living in Areas that Exceed National Air Standards - Maryland



May 2004

**Maryland Population = 5.296 million**

# Ground Level Ozone

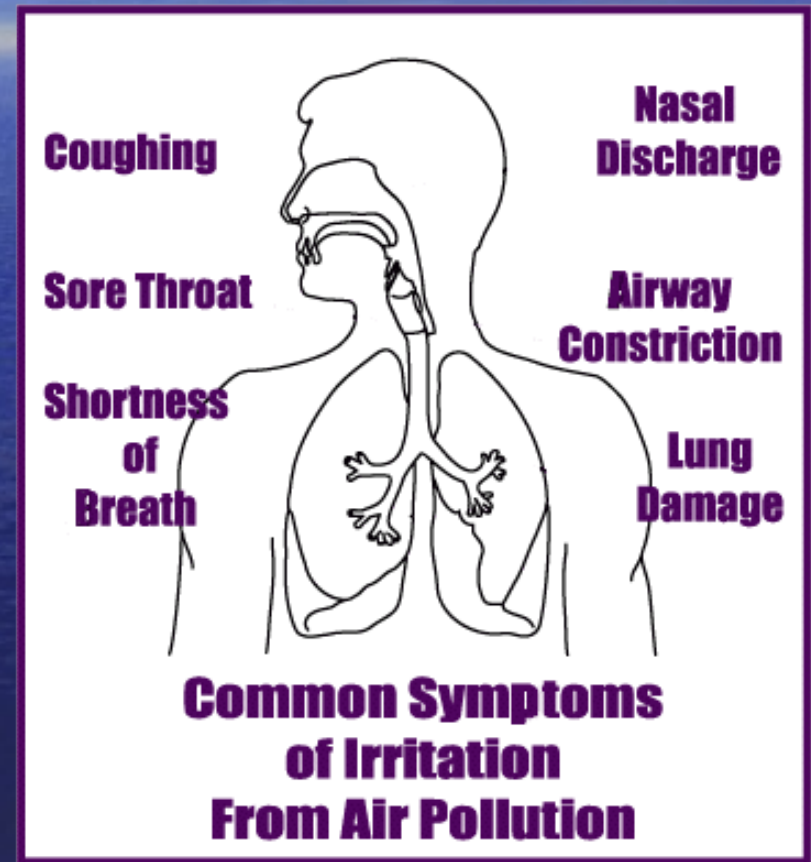


- What we typically call **smog** is made up of ground level ozone
- Ozone forms in a chemical reaction with nitrogen oxides, organic chemicals & sunlight
- Ozone is mostly a problem in summer months



# Health Effects of Ground Level Ozone

- Ozone interferes with normal lung function, aggravates respiratory diseases, and causes eye irritation.
- Most common symptom is pain from taking a deep breath.
- Long term exposure to ozone may lead to scarring & premature aging of the lungs.



# Maryland Counties that Exceed National **Ozone** Limits

- Anne Arundel
- Baltimore
- Calvert
- Carroll
- Cecil
- Charles
- Frederick
- Harford
- Howard
- Kent
- Montgomery
- Prince George's
- Queen Anne's
- Washington

and Baltimore City



## Attainment and Nonattainment Areas in the U.S. 8-hour Ozone Standard



- Attainment (or Unclassifiable) Areas (2668 counties)
- Nonattainment Areas (432 entire counties)
- Nonattainment Areas (42 partial counties)

# Ground Level Ozone is Different than Stratospheric Ozone



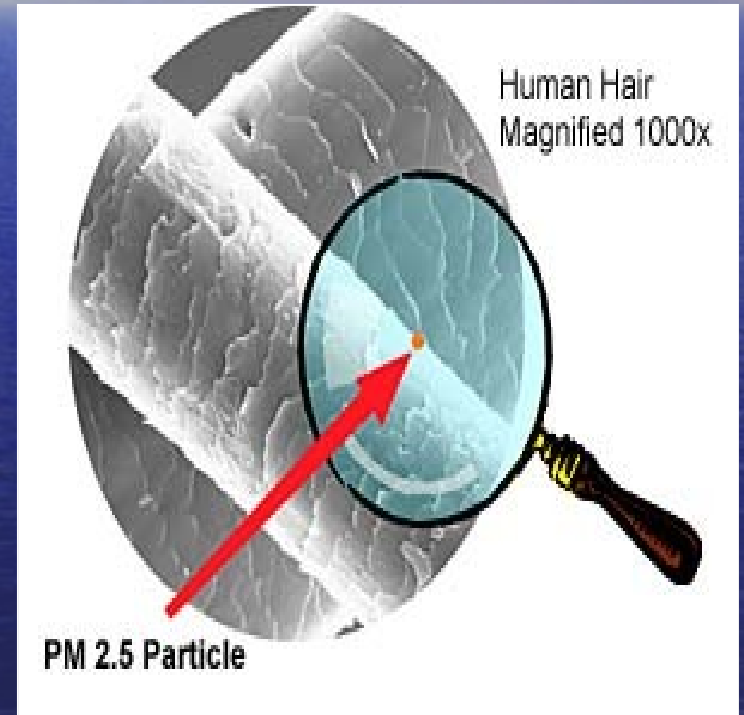
Good up High...

...Bad  
Nearby !!!



# What is Fine Particulate Matter ?

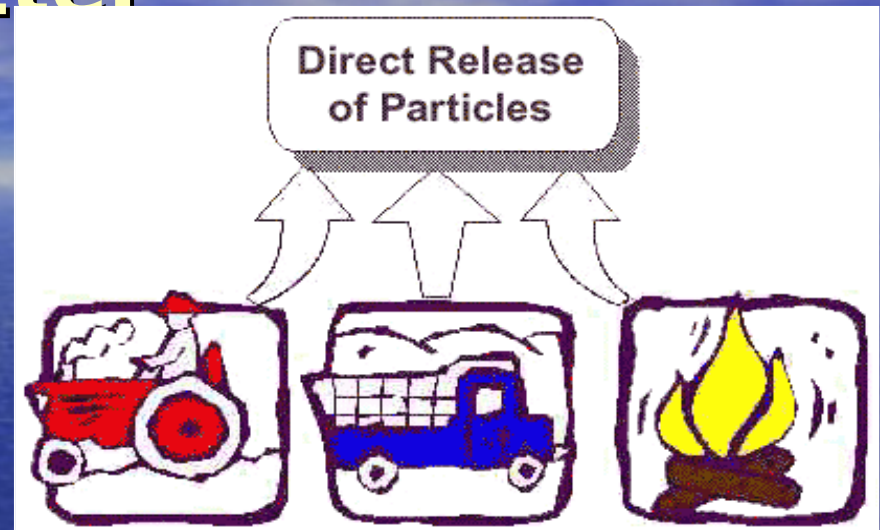
- Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets.
- These small particles can be suspended in the air for long periods of time.
- Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can only be detected with an electron microscope.



# Types of Fine Particulate Matter

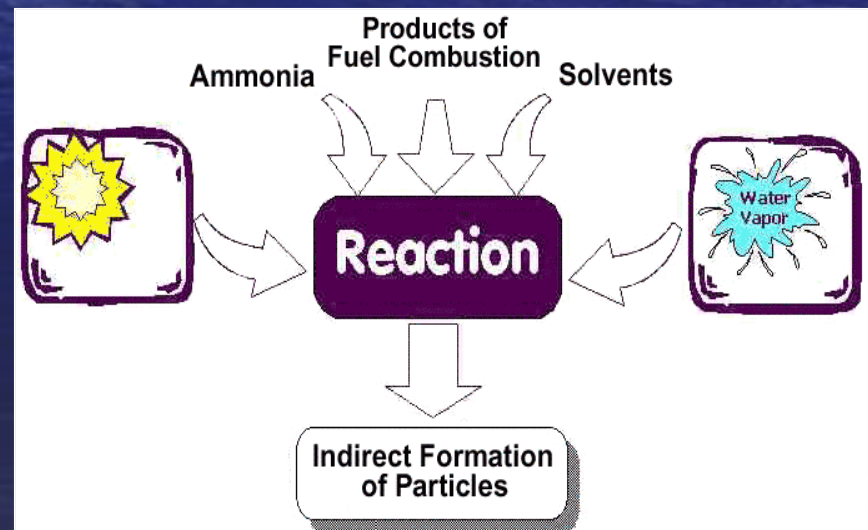
## Primary Particles

- These particles are emitted directly from air pollution sources such as power plants, factories, automobile exhaust, construction sites, unpaved roads, wood burning



## Secondary Particles

- Formed in the atmosphere indirectly when gases from burning fuels react with sunlight and water vapor and are chemically transformed into particles

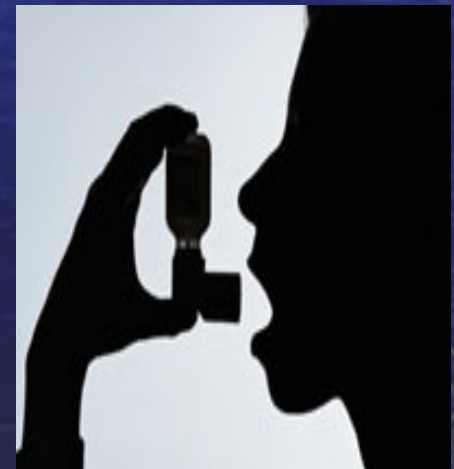




# Health Effects From Fine Particles

Many scientific studies have linked breathing PM to a series of significant health problems, including:

- aggravated asthma
- respiratory symptoms like coughing and difficult or painful breathing
- chronic bronchitis
- decreased lung function
- heart arrhythmia and heart attacks
- premature death



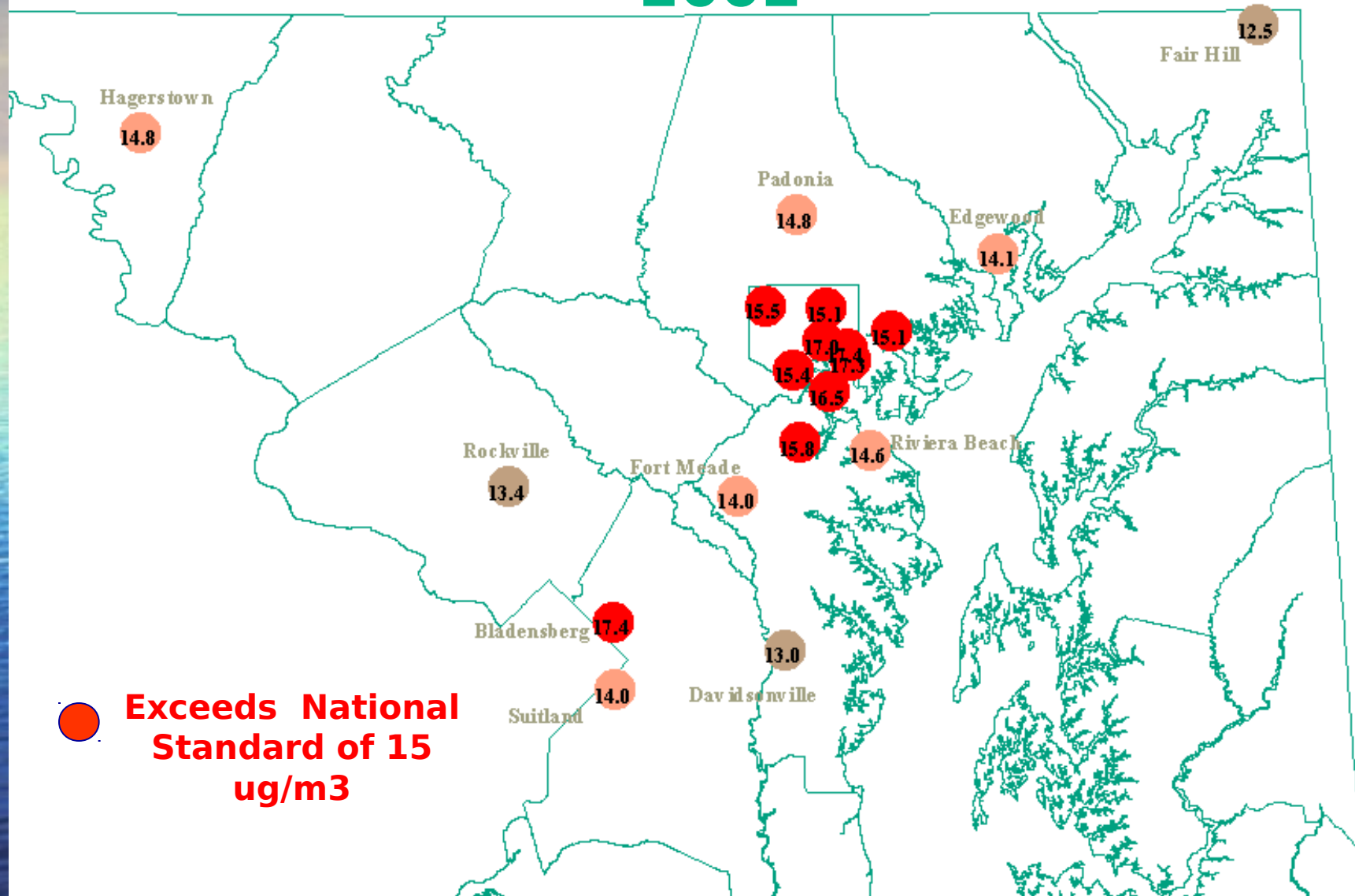
# Maryland Counties that Exceed National **Particulate** Limits

- Anne Arundel
- Prince George's
- Baltimore

and Baltimore City



# Fine Particle Levels in Maryland 2000-2002

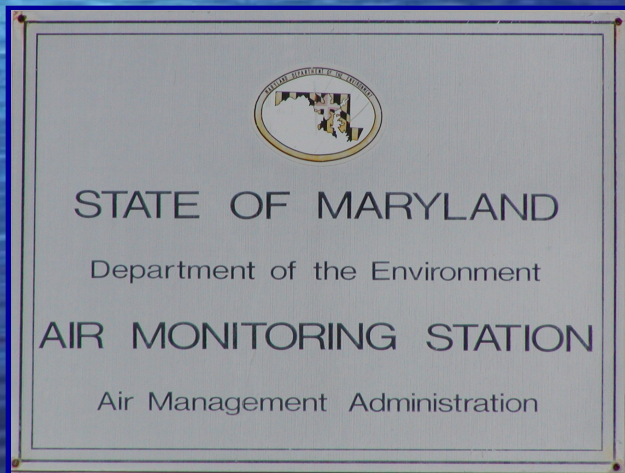
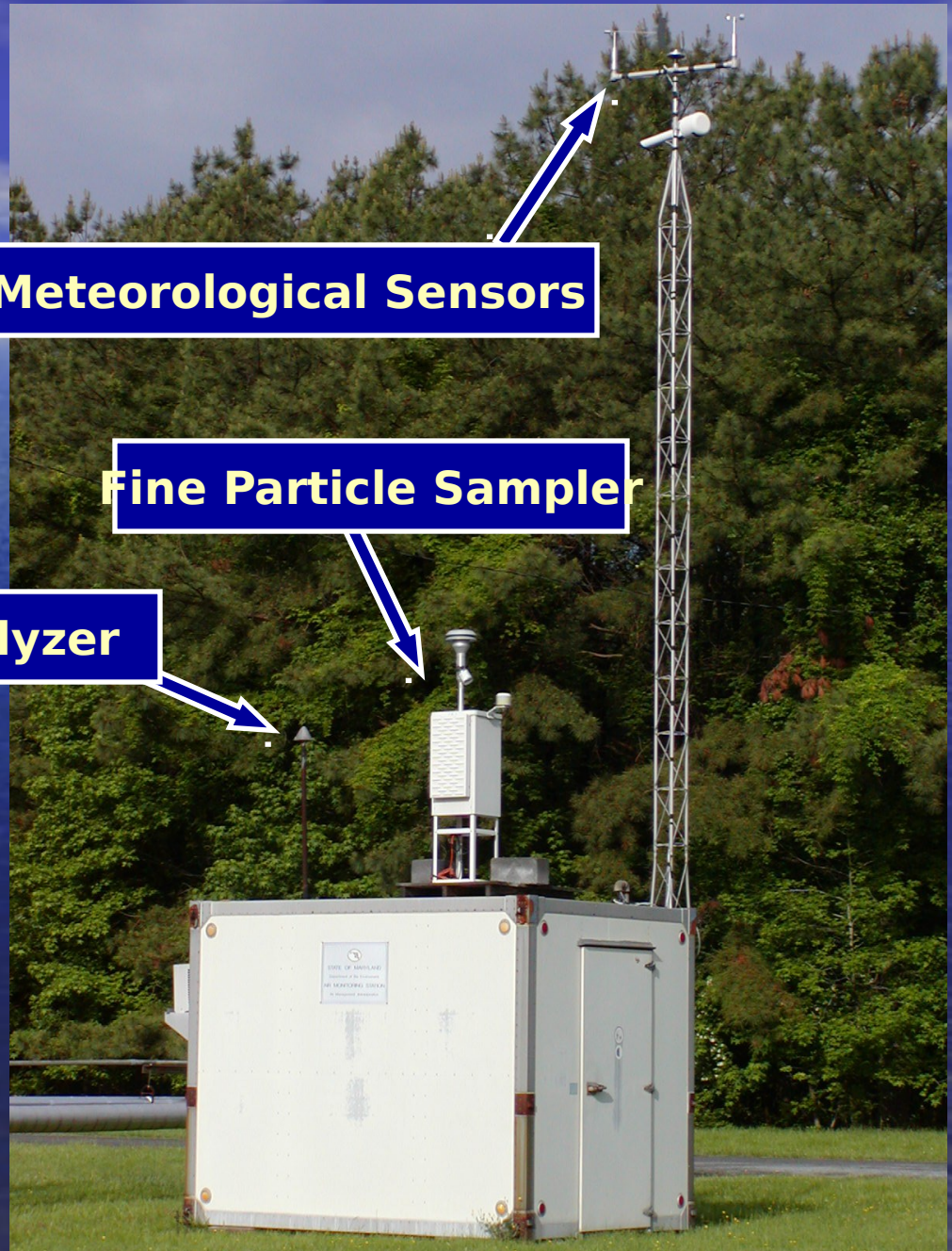


# Maryland Air Monitoring Station

Meteorological Sensors

Fine Particle Sampler

Air Intake for Ozone Analyzer



May 2004



**Wind Direction**

**Wind Speed**

**Temperature**

**Relative Humidity**

**Fine Particle Sampler**

May 2004

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# How to know if it's a Bad Air Day...

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>...air quality conditions are:</i>	<i>...as symbolized by this color:</i>
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

**Check out the Air Quality Index**



# Where to Find Real-Time Air Quality Data on the Internet

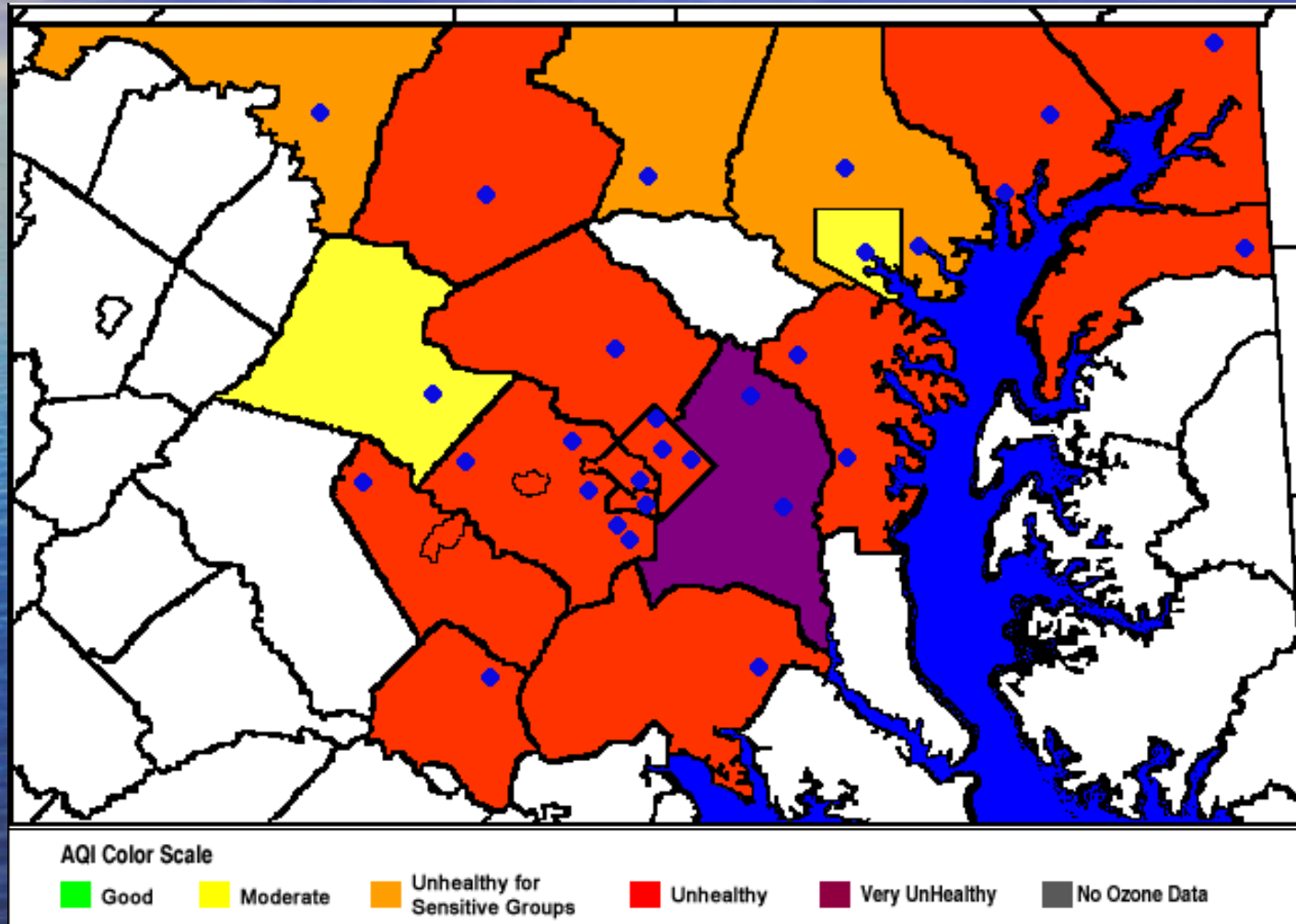
- For locations throughout Maryland go to ***Air-Watch.net*** operated by the Maryland Department of the Environment at:  
<http://air-watch.net/>



- For locations throughout the United States go to ***AIRNow*** operated by the U.S. Environmental Protection Agency at:  
<http://www.epa.gov/airnow/>



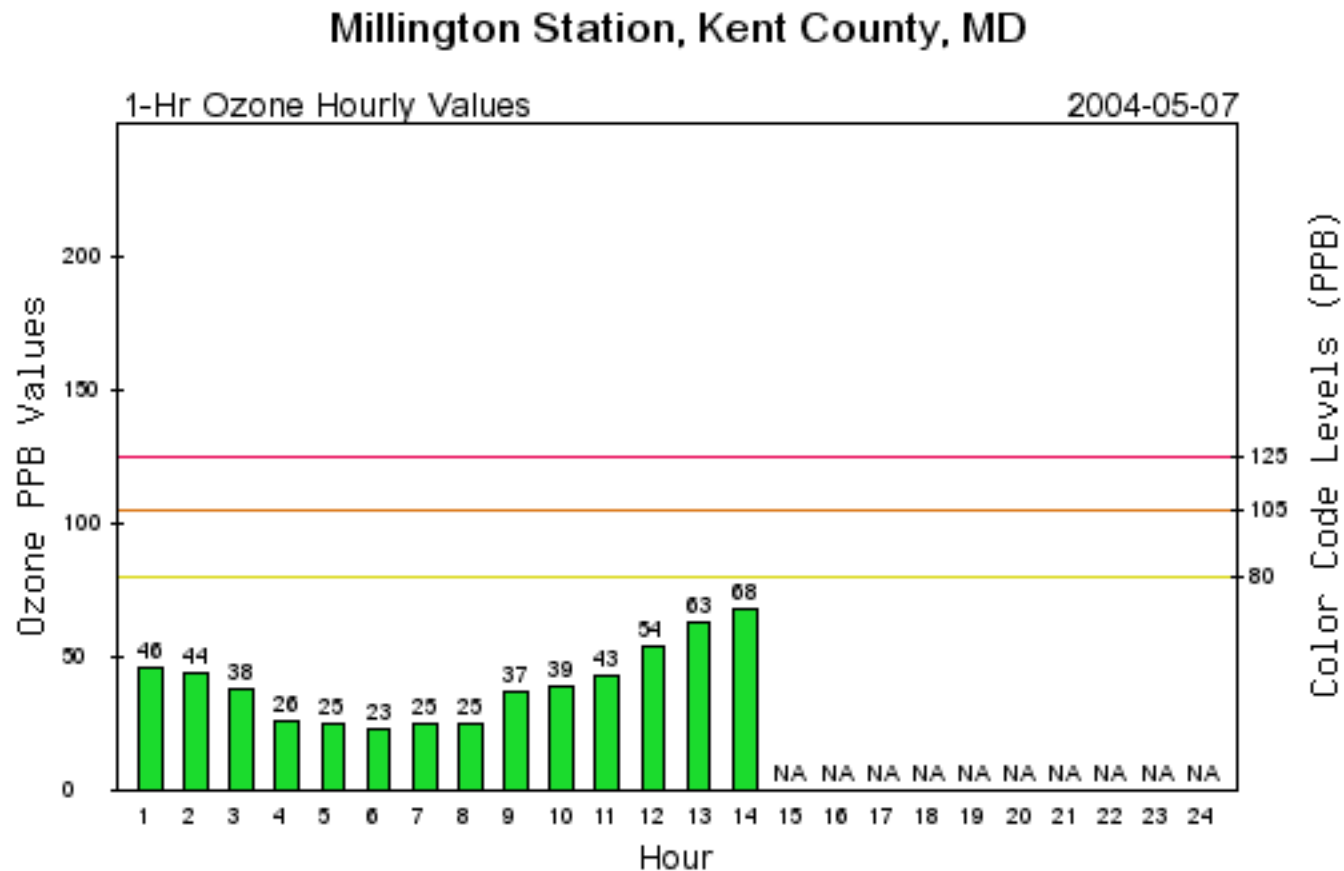
# *Air-Watch.Net* shows AQI color for each Maryland county



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# ***Air-Watch.Net*** tracks AQI color for every hour of the day



# *Air-Watch.Net* compiles AQI color for each day of the month

Sun Day 1	Mon Day 2	Tue Day 3	Wed Day 4	Th Day 5	Fri Day 6	Sat Day 7
60 PM-2.5 24-HR <u>Old Town</u> 12 AM	39 Ozone 8-HR <u>Long Park</u> 3 AM	51 PM-2.5 24-HR <u>Old Town</u> 11 PM	51 PM-2.5 24-HR <u>Old Town</u> 1 AM	55 Ozone 8-HR <u>Rockville</u> 8 PM	74 Ozone 8-HR <u>McMillian Reservoir</u> 9 PM	72 PM-2.5 24-HR <u>Old Town</u> 1 PM
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
56 PM-2.5 24-HR <u>Old Town</u> 12 AM	58 Ozone 8-HR <u>Millington</u> 9 PM	77 Ozone 8-HR <u>Edgewood</u> 8 PM	110 Ozone 8-HR <u>Fairhill</u> 11 PM	103 Ozone 8-HR <u>Fairhill</u> 12 AM	63 PM-2.5 24-HR <u>Old Town</u> 10 PM	50 PM-2.5 24-HR <u>Old Town</u> 12 AM
Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
41 PM-2.5 24-HR <u>Old Town</u> 11 PM	43 PM-2.5 24-HR <u>Old Town</u> 3 AM	37 PM-2.5 24-HR <u>Old Town</u> 12 AM	36 Ozone 8-HR <u>Hagerstown</u> 11 PM	73 PM-2.5 24-HR <u>Old Town</u> 11 PM	74 PM-2.5 24-HR <u>Old Town</u> 2 AM	46 PM-2.5 24-HR <u>Old Town</u> 12 AM
Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28
33 Ozone 8-HR <u>Davidsonville</u> 8 PM	76 Ozone 8-HR <u>Davidsonville</u> 8 PM	155 Ozone 8-HR <u>South Maryland</u> 8 PM	201 Ozone 8-HR <u>Equestrian Center</u> 7 PM	203 Ozone 8-HR <u>Edgewood</u> 8 PM	167 Ozone 8-HR <u>Fairhill</u> 12 AM	86 PM-2.5 24-HR <u>Old Town</u> 12 AM

AQI value

AQI Pollutant

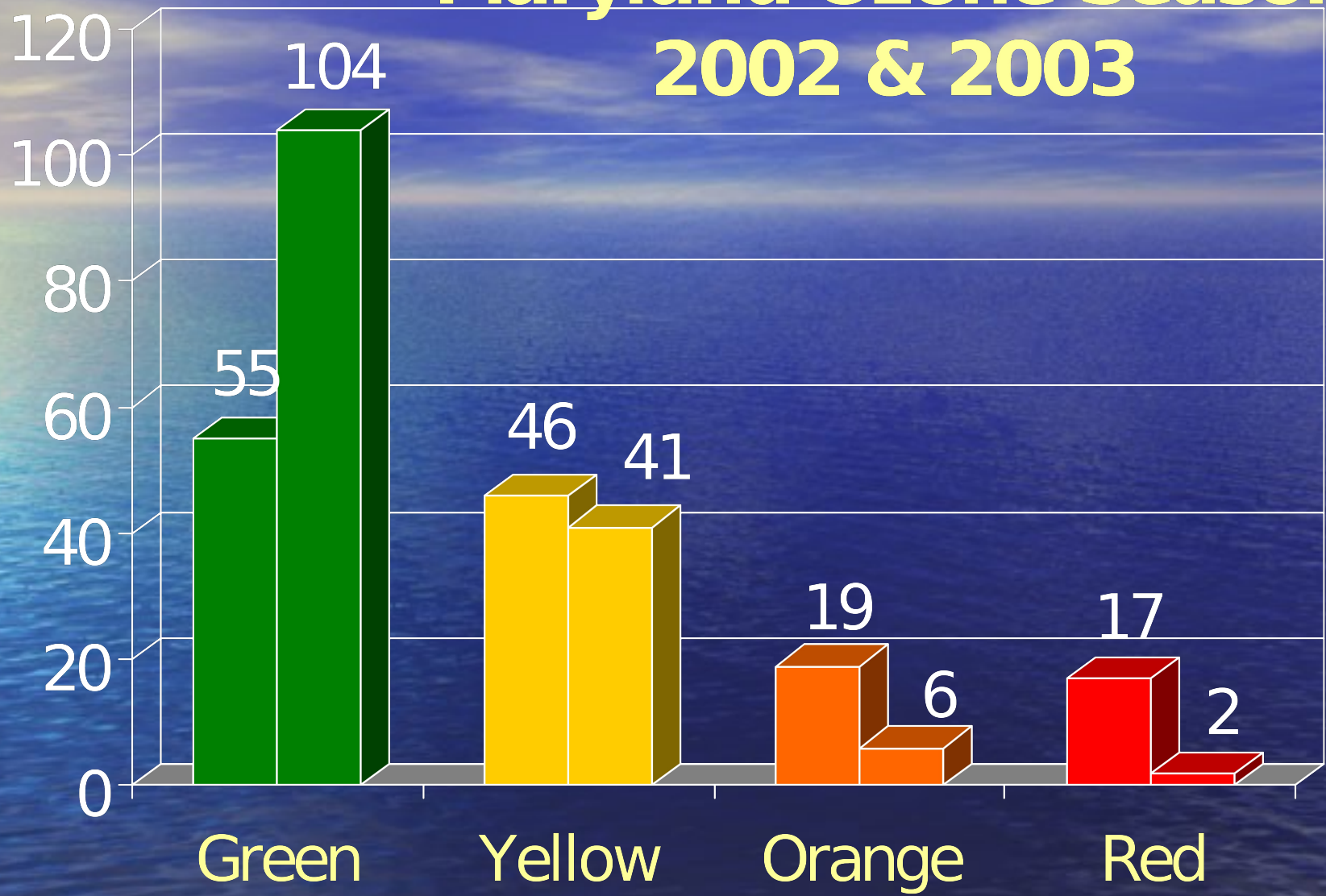
Monitoring Station

Time of day high pollutant level was recorded



# Maryland Ozone Season 2002 & 2003

Number of Days



May 2004

AQI Color-of-the-Day

# Air Quality in the Media



May 2004



# Protect your Health when High Ozone Levels are Expected

- If an **Orange**, **Red**, **Purple** or **Maroon** day is predicted, restrict outdoor activities & observe local health warnings
- Exercise early in the morning or late in the evening (when ozone levels are lowest)
- Avoid midday or afternoon exercise, avoid strenuous outdoor work in the late afternoon and early evening
- Avoid congested streets and rush hour traffic; pollution levels can be high up to 50 feet from the roadway

# Help Prevent Formation of Ground Level Ozone

- Set the thermostat a little higher in the summer
- Carpool, use public transit, walk, or bicycle
- Avoid engine idling in long drive-through lines
- Get gas during cooler morning or evening hours. Avoid spilling gas and don't "top off" the tank.
- Mow the lawn late in the evening
- Shop by phone, mail or Internet
- Telecommute



# Data and Graphics for this presentation were provided by:

**Maryland Department of the Environment**



Air & Radiation Management Administration

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and



**U.S. Environmental Protection Agency**